

New hydrogen production method could reduce need for fossil fuels

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(PhysOrg.com) -- Scientists have created an entirely natural and renewable method for producing hydrogen to generate electricity which could drastically reduce the dependency on fossil fuels in the future.

The breakthrough means ethanol which comes from the fermentation of crops can be completely converted to hydrogen and carbon dioxide for the first time.

The hydrogen generated would be used to power fuel cells - devices

which convert fuels into electricity directly without the need for combustion.

The new method - which has the potential to be used to power homes, buildings and cars in the future - is the result of a 10 year collaboration project between scientists from the University of Aberdeen alongside international partner laboratories.

Over 90% of the hydrogen currently generated across the globe is made using natural gas found in fossils fuels.

The main concern with this method is the generation of large amounts of carbon dioxide increasing the risk of global warming.

This new production method uses ethanol which is produced by the fermentation of crops and is therefore carbon neutral meaning any carbon dioxide produced is assimilated back into the environment and used by plants to grow.

Professor Hicham Idriss, Energy Futures Chair at the University of Aberdeen who has led the study said: "We have successfully created the first stable catalyst which can generate hydrogen using ethanol produced from crop fermentation at realistic conditions.

"Moreover, hydrogen generated using this method is very clean and therefore suitable for fuel cells because it also converts all carbon monoxide, which is poisonous, generated in the process to carbon dioxide at the same time.

"The catalyst is made of very small nanoparticles of metals deposited on larger nanoparticles of a support called cerium oxide which is also used in catalytic converters in cars. At present the generation of hydrogen needed to power a mid size fuel cell can be achieved using 1 Kg of this

catalyst.

"As with traditional methods of hydrogen production, carbon dioxide is still created during the process we have developed. However unlike fossil fuels which are underground we are using ethanol generated from an above the ground source - plants or crops. This means that any carbon dioxide created during the process is assimilated back into the environment and is then used by plants as part of their natural cycle of growth.

"It's quite feasible that we could see the use of this new type of catalysts to generate the hydrogen used in the UK in the future if the necessary changes to public policy were implemented."

The work is published in the new journal devoted to sustainable chemical reactions: *ChemSusChem*, vol 1, 905 (2008).

Provided by University of Aberdeen

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